

INTRODUCTION

The Khibiny Mountains are situated in the western part of the Kola Peninsula between 67°35' and 67°55'N and 33°15' and 34°20'E (Fig. 1).

They are the highest mountains in Murmansk Province rising approximately 800-900 meters above the surrounding hilly plain. The highest mountain in Murmansk Province is Chasnachorr Mountain (1191 m altitude).

The climate is determined by the latitude, is affected by the ice-free Barents Sea and warm air masses advancing from the Atlantic during the cold period, as well as by local conditions. Thaws are frequent in winter, whereas in summer frosts are not uncommon, especially in early June and late in August. Morning frosts and snowfalls may happen all of a sudden even in July. The winter lasts about 6.5 months at the foot of the mountains and ca. 8 months at the plateau. The "midnight sun" period extends from the end of May till mid-July.

The Khibiny mountains were formed in the Tertiary period as the result of tectonic uplifting of Paleozoic alkaline intrusions. The intrusions are essentially comprised of nepheline syenite of the Devonian age. The relief was produced by erosion, ploughing and accumulating activity of ancient glaciers. The main features of the relief are flat tops (plateaus) with rough borders, divided by trough valleys and lateral and terminal moraine deposits. Mountain passes are crossing the troughs, whereas in the radial direction the massif is crossed by river valleys. The soils are derived from nepheline syenite eluvium, and they are stony, shallow, poor and cold.

Flora and vegetation

The flora of the Khibiny Mts. is quite rich. It includes 449 species of vascular plants, 148 species of hepatics, 288 mosses and ca. 350 lichens.

All the lower mountain slopes are within the forest zone, which climbs up as high as 370 meters. Spruce forests composed of *Picea obovata* cover the inner slopes and south-exposed slopes, whereas pine forests composed of *Pinus friesiana* prevail on western, eastern and northern slopes of the mountains. Mixed spruce and pine forests are quite common. This is real northern taiga with a rather poor species composition and simple structure. The tree layer is formed by two or three dominating tree species, which is a special feature of all northern taiga forests. Besides spruces and pines, the most widespread are *Sorbus gorodkovii*, *Alnus incana*, *Populus tremula*. The bush layer is weakly developed and consists mainly of willows and *Juniperus sibirica*. The field layer composition is determined by the topography and moisture conditions. The most typical are dwarf shrubs from the *Vacciniaceae* family: *Vaccinium myrtillus*, *Empetrum hermaphroditum*, *Vaccinium vitis idaea*, and some herbs - *Chamaepericlymenum suecicum* (*Cornus suecicus*), *Melampyrum pratense*, *M. sylvaticum*, *Bartsia alpina* etc. The ground layer is luxuriant, the most widespread mosses being *Pleurozium schreberi*, *Hylocomium splendens*, *Dicranum* spp., and *Polytrichum* spp. Lichen patches of the *Cladonia* spp., *Peltigera* spp. etc. are mixed amidst mosses, but sometimes prevail in the ground layer. Here and there, the forest is interrupted by rock outcrops, rocky fields, rivulet and spring valleys.

The belt of the mountain birch forest spreads up to 450 meters. These forests are typical of the entire Fennoscandia, where they form the timberline. The timberline on inner or gentle mountain slopes is shifted much higher (to 450 m alt.) than on a wind-swept ridge or steep slope (350-370 m alt.). The tree layer is dominated by the *Betula pubescens* spp. *czerepanovii*. More frequent are isolated individuals, but sometimes one can find groups of gnarled trees, which depends on

steepness of the slope, height above the sea level and available moisture. The gnarled, twisted and multi-stemmed growth forms of the mountain birch are quite characteristic for Khibiny. The species composition of the field and ground layer is similar to that of the coniferous forest zone with its mosaic-like structure. Rivers and spring valleys, plentifully moistened during the summer, obtain a most luxuriant vegetation. There are many peculiar blossoming herbs here, spreading from the foothills to higher elevations. The most abundant are *Cirsium heterophyllum*, *Geranium sylvaticum*, *Trollius europaeus*.

The mountain tundra spreads up above the timberline to as high as 900-1000 meters and occupies the greater part of the Khibiny. The landscape is bleak because of strong winds, low temperatures, and thin and stony soils. Here we find dwarf shrubs and lichen heath, moss and lichen cushions in the rock fields and meadows along brooks and springs. And finally, at 900-1000 m above the sea level, they are superseded by the high mountain stony desert belt, occupying the remaining area. The prevailing plants here are crustose epilithic lichens and mosses, the diversity of vascular species being extremely poor, with an open, scattered structure of the plant cover.